Available online at
http://www.anpad.org.br/bar

BAR, Rio de Janeiro, v. 13, n. 3, art. 1,
e160018, July/Sept. 2016
http://dx.doi.org/10.1590/1807-7692bar2016160018

Do Strategic Behaviors Link Travel Agencies in Brazil?

Regina Madalozzo[1]
Paulo Cesar Fernandes[1]

Insper Instituto de Ensino e Pesquisa[1]

Received 12 February 2016; received in revised form in 25 May 2016; accepted in 3 July 2016; published online 25 August 2016.

Abstract

Information and communication technology improvements have challenged the organized and stable network of airlines, global distribution systems (GDS) and travel agencies. In Brazil, traditional travel agencies have faced significant challenges in maintaining their businesses because airlines have forced disintermediation by cutting commissions and reduced distribution costs by selling their product directly through airline websites. This study explores the existence of strategic groups in the Brazilian travel agency market to elucidate how they interact with GDS and other travel agencies to maintain and improve their market position. A latent class analysis model was applied to a sample of 4,288 travel agency points of sale located in Brazil. The study results identified groups with members that exhibited similar behaviors in their relationships with GDS and other travel agencies. The study findings do not support claims regarding the demise of the travel agency business model.

Key words: travel agencies; airline industry; global distribution systems; latent classes analysis; Brazil.

Introduction

Over the last few decades, the travel agency industry has seen dramatic improvements in airline reservation processes due to information and communication technology (ICT) enhancements that motivated the transition from manually collecting pricing and availability data to the current state-of-the-art integrated systems that simultaneously obtain and compare booking information for multiple airlines. These enhancements have redefined the structure of distribution channels and affected the economic power of supply chain members (Berne, Garcia-Gonzalez, & Mugica, 2012).

Global distribution systems (GDS) began to emerge in the 1960s. These systems were initially created to distribute airline information and were owned by the individual carriers (Marin, 2004). However, those systems evolved and currently also distribute information from other providers such as hotel chains and car rental companies. Moreover, GDS became large, independent corporations with a business model that requires providers to pay booking fees. Bookings are usually obtained by travel agents, who receive financial and/or operational rewards for using the system.

Both costs and competition in the airline business have risen significantly (Cento, 2009). Airlines have thus viewed ICT improvements as providing a significant means of reducing their distribution costs (Buhalis, 2000), which primarily consist of GDS booking fees and travel agent commissions. The new business scenario has prompted discussions of the future of global distribution systems (Granados, Kauffman, & King, 2008) as well as impassioned debates regarding the extent to which traditional travel agencies can survive and the need for travel agencies to identify how they can adopt strategies that will enable them to develop and grow.

Little consensus exists regarding the future because the current situation presents both great opportunities and threats to all parties involved (Cheung & Lam, 2009). Moreover, ICT improvements have contributed to both the intermediation and disintermediation currently occurring in the tourism market (more analysis in Figueiredo, Gomes and Farias (2010) about Brazilian hotels and Abou-Shouk, Lim and Megicks (2016) on travel agents in Egypt). This situation increases the uncertainty of the complex travel agency business environment, which involves numerous parties who provide an enormous array of different products and services.

In the context of the relationship between travel agencies and airline companies, the travel agency market can be segmented into different business models such as TMCs (travel management companies), tour operators, receptive tourism, airline ticket consolidators and affiliate retail travel agencies. Duliba, Kauffman and Lucas (2001) study the impact of the appropriation of value by ICT investments airlines made in travel agencies. They conclude that the return is not only reflected in firm (airline) performance, but also in possible benefits from information technology.

This study aimed to identify groups of travel agencies that adopt similar business strategies for distributing airline information in the Brazilian market, regardless of the extent to which they belong to the same market segment. Therefore, the study focuses on the existence of strategic groups in the Brazilian travel agency market. Our basic hypotheses are:

H1: There are similarities that ensure strategic group formation and dissimilarities that justify distinctions among them.

H2: These groups have some common factor within each group, and identifying this factor would lead to better understanding of their behavior.

H3: If this strategic behavior is identified, we can conclude that this market may be struggling to survive in a changed economic environment.

To contribute to our understanding of the disintermediation process promoted by the airline industry to reduce distribution costs, this empirical study used latent class analysis to analyze data

regarding airline bookings created and/or canceled at 4,288 points of sale (POS) for 2,342 different travel agencies in Brazil. Data from travel agencies was analyzed because they serve as intermediaries in the airline ticket sales market. Moreover, understanding travel agency strategies enabled us to identify groups that might be more vulnerable and/or at risk of being eliminated due to the process of disintermediation. This study also explored power relationships among members of the supply chain, in which parties are highly interdependent and competition and collaboration typically coexist.

Second section presents a literature review that briefly describes the origin and development of travel agencies and GDS. That section also discusses airline ticket sales intermediation and disintermediation processes. Third section describes the major concepts and parameters associated with the Latent Class Analysis Model, and fourth section relates the data and the study variables. Next section includes the results of the empirical analysis for each strategic group. The concluding section describes the analysis of the study results and the relationships and strategy of each group.

Literature Review

The analysis of travel agency strategic groups was two-fold. First, it was critical to explore the existence of strategic groups and the procedures used by the latent class model to identify these groups. Second, it was necessary to determine how travel agencies respond to the competition among different airline booking distribution channels, which are strongly influenced by global distribution systems. This section describes the historical and conceptual context of the travel business environment in which travel agencies play an important role.

Global distribution systems and travel agencies

Technological advances have led to the construction of commercial aircraft with higher capacity and flight autonomy, increasing the number of available airline seats and generating higher passenger traffic. Moreover, the inherently perishable nature of the airline product together with high fixed costs necessitated the implementation of efficient distribution channels to optimize airline tickets sales through automated processes - in a broader context, Van Vleck (2013) presents the history of aviation from the North American lens. If interested in a national (Brazilian) context, Pereira (1987) has an interesting approach.

However, providing tourism services has been one of the main activities of travel agencies since they were introduced in England in the nineteenth century. Thus, the development of trade relationships between travel agencies and airlines is a natural consequence of the evolution of the airline business, which needed efficient and comprehensive distribution mechanisms.

Lago and Cancellier (2005) note that airlines installed terminals that were directly connected to airline reservation systems in travel agencies to increase ticket sales in the 1970s and 1980s. This strategy represented a major advance from earlier sales processes, which were completely manual and involved phone calls to airline call centers.

However, installing proprietary systems and dedicated terminals produced high financial and operational costs to both travel agencies and airlines. In addition, costs and difficulties were associated with replication of the model beyond the airline's home country. Airlines invested in the development of complex computerized reservation systems (CRSs) to meet the needs of travel agents.

Thus, the creation of global distribution systems (GDS) in the pre-Internet age attempted to meet the need to automate the airline ticket sales process, the need to expand the geographic scope of distribution channels and the demand to reduce costs. Iordache and Voiculet (2010) note that a GDS is an information system that allows the tour operator to access the prices and availability of airlines and other service providers to optimize the sales process. The authors claim that travel agents previously

spent approximately 80 per cent of their time collecting existing information from multiple and stand-alone sources and only 20 per cent of their time in the revenue-generating activities of booking and issuing the tickets and vouchers associated with the sale. They also identify four major global distribution systems (GDS): Amadeus, Galileo, Sabre and Worldspan.

From the travel agency perspective, GDS represented obvious cost savings and productivity increases, and accessing the content of various different airlines from a single terminal was viewed as an important improvement. Connectivity was also established between airline and GDS reservation systems, which resulted in the availability of online information on flights and a dramatic increase in the geographic scope of the market because it eliminated the need to install dedicated terminals worldwide. Figure 1 provides an overview of this environment.

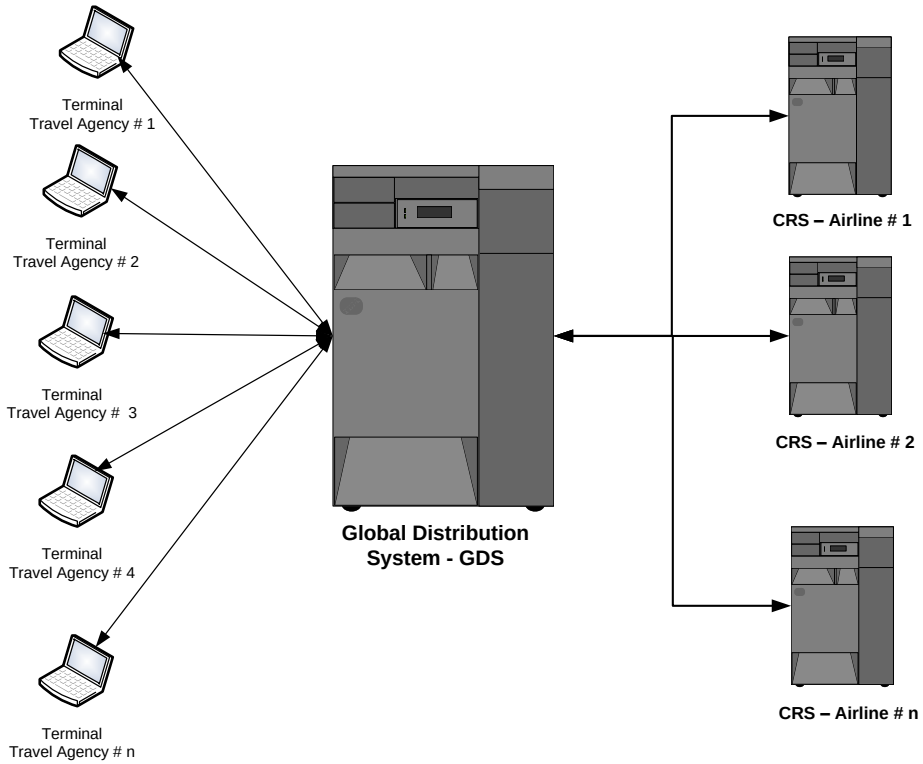

Figure 1. Overview of Travel Agency, GDS and CRS Connectivity
Source: Qualitative information produced by the author.

Thus, key drivers that motivated airlines to create global distribution systems included the sharing of distribution costs (including costs associated with the development and maintenance of automated reservation systems), increased travel agency point-of-sale productivity, and expansion of the sales force in remote countries.

The GDS business model is primarily based on collecting booking fees from the content provider for purchase transactions made by travel agents. Thus, travel agency production of bookings generates the revenue that accounts for both GDS profits and the expenditures associated with developing and maintaining the system. With respect to airline content, the carrier that distributes its flights though the GDS pays the booking fee. In addition, travel agencies that do not generate the contractually determined number of bookings are subject to GDS administrative fees, and travel agencies that surpass contractual booking targets receive financial or operational rewards. Figure 2 provides an overview of the economic path described above.

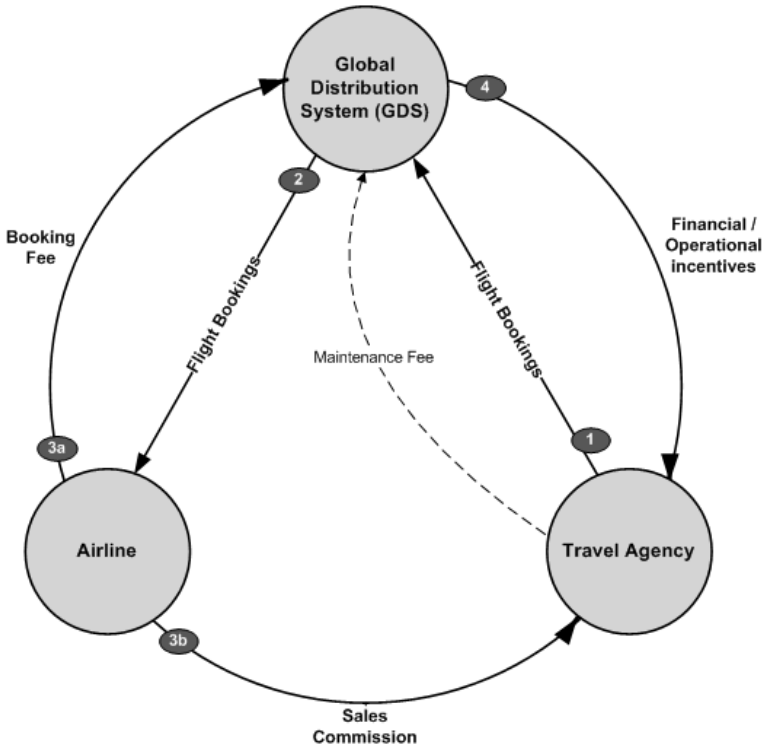

Figure 2. GDS, Airline, Travel Agency: Simplified Economic Flow
Source: Qualitative information produced by the authors.

Buhalis (2000) states that globalization has created rapid change in the tourism market and that information technology has reduced operating costs and increased new services. He also notes that airline representatives must develop direct channel relationships with their customers, who increasingly demand rapid solutions to problems and more detailed information.

Cento (2009) notes that the pronounced growth in the aviation market in the nineties, which was considered a major historical **boom**, was followed by a series of crises with a direct impact on the market, such as the September 2001 terrorist attacks in the United States, the Asian flu (SARS) and the 2003 Iraq War. Concurrently, increased competition in the sector due to the emergence and growth of low cost carriers (LCC) further reduced the earnings of traditional, full service airlines. Cento (2009) also demonstrates that the low cost carrier business model involves point-to-point flights between cities with high passenger density, use of secondary airports, a standardized aircraft fleet that reduces maintenance costs, simplified services and reduced costs for selling tickets that are primarily — although not exclusively — supported by direct sales channels such as airline web portals.

In contrast, the traditional, full-service airline business model typically involves a complex route network that is centralized in one or more major airports, flights with connections, development of alliances with other airlines to increase network coverage, complex revenue management systems due to the need to maximize profits for each route and multiple sales channels that include global distribution systems.

In addition to increased competition, another airline business challenge is the high price of jet fuel. The price per barrel rose from approximately USD$ 30 in 2003 to more than USD$ 100 in 2008 (Cento, 2009). Data from organizations such as the International Air Transport Association [IATA] (n.d.) and Airlines for America [A4A] (n.d.) indicate that fuel prices remained high in 2012. In this scenario, many airlines face serious cash flow issues that prevent them from hedging in fuel futures markets. Even if they were able to do so, it would be difficult to find investment banks that would accept the risk.

Brazilian Airlines Association (*Associação Brasileira das Empresas Aéreas* [ABEAR], n.d.) notes that two unique variables explain most of air-transport seat demand: GNP and airfare price. It also

states that the airline industry is a concentrated segment worldwide and in Brazil the four main airlines – Avianca, Azul, Gol and Tam – composed more than 90% of the domestic market during years 2011 to 2013. Nevertheless, ABEAR highlights that yield values, represented by revenue per passenger, have been decreasing in the Brazilian market since the year 2002, when price controls were lifted due to deregulation. The local high taxation of aviation fuel along with weaknesses of Brazil's aeronautical infrastructure reduced the actual growth of the airlines during a period of global economic growth. During crisis intervals, airlines usually foster further operational efficiency gains including reducing offerings (*i.e.* cutting route availability and/or aircraft return). The characteristic low rate of return of the airline industry also plays an important role in the continuous challenges airlines have been experiencing over the years as returns are normally lower than the industry long-term cost of capital (IATA, 2015). This whole scenario has not changed during the period represented by the sample used in this study, which is consistent with the understanding that the results should not be biased by particularities of the airline business environment.

Airline distribution costs are also very high. Granados, Kauffman and King (2008) argue that in addition to travel agent sales commissions, airlines incur significant costs when distributing through GDSs, whose profit margin is far greater than the profitability of the airlines that serve as the primary source of GDS revenue. The authors claim that the Internet and other information technology advances have increased the risk of disintermediation and classify GDSs as "newly vulnerable markets" (Granados, Kauffman, & King, 2008, p. 2) for several reasons: fewer barriers to entry exist due to technological advances, they are vulnerable to attack due to high profits and they are difficult to defend due to the nature of their business structure (that is, legacy systems and strategic inflexibility).

A similar situation arises for traditional travel agencies, which provide more complex services that require high-level knowledge and intensive labor compared to new entrants such as online travel agencies or airline web portals, which provide less complex services.

Therefore, airlines seek disintermediation to reduce distribution costs. They also argue that direct sales channels improve the opportunity to sell services other than the basic airline tickets, such as priority check-in services, VIP lounge access, comfortable seats and door-to-door service. Duliba *et al.* (2001) model the value appropriation of the implementation of new technology on the reduction of all these costs at the same time it gave more control – to the airlines – on passenger profile information, a distinct benefit to the airlines that belonged to travel agencies.

Faced with these challenges, GDSs have sought to reinvent themselves by leveraging the power of the large investment and financial reserves they have accumulated over the years. Raymond and Bergeron (1997) conducted a field study with 33 travel agencies and noted that the GDS industry changed the travel agencies industry by introducing an inter-organizational information system and allowing firms to sophisticate their own organizational information system. They have also focused on transforming their assets (knowledge of the airline business and strong partnerships developed over time) into competitive advantages. They intend to maintain their success by offering differentiated solutions and aggregated content from various providers.

Traditional travel agencies also face daunting challenges. Marin (2004) identifies the following: maintaining profitability despite reduced or eliminated airline commissions, competition with airline direct sales channels and new entrants such as online travel agencies, investments in technology to optimize internal and external processes, differentiation, personalization and work reduction, which requires a skilled workforce. These factors are the main foundation to Hypothesis 3 (H3).

The importance of the latent class model in revealing strategic groups

Strategic groups are groups of companies within the same industry that exhibit similar business models and/or strategies (which is necessary to test H1). Czepiel (1992) notes that strategic group members are similarly affected and respond similarly to business changes and relevant trade events. He also states that competition among members of the same strategic group is greater than competition among companies that belong to different strategic groups (a result we expect by testing H2). Moreover,

classifying companies into strategic groups enables identification of their common strengths and weaknesses. However, there is currently no academic consensus regarding the existence of strategic groups for the tourism market, and considerable controversy exists on the best method for identifying them.

In a study of the US airline industry, Murthi, Rasheed and Goll (2013) used latent class (LC) regressions to estimate a model that identified 4 different strategic groups. They noted that their model addressed the limitations of other approaches based on cluster and factor analysis because their method separated strategic group effects from firm and industry effects and tested the extent to which the existence of strategic groups could be falsified.

Collins and Lanza (2010) note that a vast literature exists on the use of latent class analysis of empirical data to identify groups and their common properties and behaviors, which allows researchers to classify members into groups with similar characteristics, which would reveal strategic groups in this study. Many examples exist of the application of latent class analysis to different firm and/or consumer data (examples include Bassi, 2013; Bhatnagar & Ghose, 2004; Cullmann, 2012). This study employs latent class analysis to identify the extent to which strategic groups exist in the Brazilian travel agency market by focusing on travel agencies' geographical strategies and the relationships among travel agencies, airlines and global distribution systems. The classification into strategic groups also allows the analysis of both the association among groups and the main differences between each group's business model.

The following sections contribute to the existing literature regarding the maintenance or elimination of travel agencies' prominent position in the airline tickets sales market by describing an approach that includes: (a) the localization strategies of travel agencies, (b) travel agencies' association with global distribution systems and (c) relationships among travel agencies in the Brazilian market. These aspects were also investigated for the airline industry by Díaz and Martín-Consuegra (2016) and Greene and Hensher (2013). Chao, Chen and Yeah (2015) study these aspects from the marketing point of view.

Empirical Approach: The Latent Class Model

The latent class model provides the most appropriate model for identifying strategy groups in travel agency data obtained for the present empirical study. Collins and Lanza (2010) note that the latent class model enables identification of groups or classes within a sample. They also stress that a model with latent variables that cannot be directly measured requires two or more observed variables or indicators that are related to each other to identify the groups. Moreover, a one-way causal relationship exists between latent variables and observed variables, which are both categorical.

The model estimates two sets of parameters. One set consists of the probability of membership in a given latent class (prevalence - γ), and the other set consists of the probabilities associated with each response that is conditional to latent class membership (item response probability - ρ). The model assumes that each individual belongs to a single, unique latent class.

A contingency table is used to analyze the relationship among the observed variables and provides the starting point for the latent class analysis. Each cell of the table corresponds to one possible response pattern. For example, if there are three observed variables and each variable has two response alternatives, eight different response patterns ($2 \times 2 \times 2 = 8$) are possible and the contingency table will consist of eight cells. The following overview is based on Sepúlveda (2003) and Collins and Lanza (2010), whose formulas and notations were used as references in the design of this study.

Basic concepts

Assume the existence of J observed variables j = 1,...,J. If each j variable has r_j different response categories ($r_j = 1,...,R_j$), the number of cells in the contingency table (W) is:

$$W = \Pi_{j=1}^{J} R_J \quad (1)$$

where R_j is the number of response categories for the observed variable j.

Each cell corresponds to a response pattern, that is, a vector $y = (r_1, ...r_j)$. Thus, there are W vectors Y = y, which are associated with probability P:

$$\Sigma P\,(Y = y) = 1 \quad (2)$$

The model is intended to identify groups that are termed latent classes. Each class has a prevalence or associated probability P(L=c), which is one of the parameters estimated by the model.

For a given class c= (1,...,C), the prevalence γ_c can be represented as:

$$\sum_{c=1}^{C} \gamma_c = 1 \quad (3)$$

Thus, for a particular latent class c and a particular observed variable j, which is associated with the response category r_j, we have:

$$\sum_{r_j=1}^{R_J} \rho_{j,r_j|c} = 1 \quad (4)$$

where $\rho_{j,r_j|c}$ corresponds to the probability associated with the response category r_j conditional on membership in class c.

The concepts described above support the expression that generalizes the latent class model, which calculates the probability associated with a particular vector of responses Y = y:

$$P(Y = y) = \sum_{c=1}^{C} \gamma_c \prod_{j=1}^{J} \prod_{r_j=1}^{R_j} \rho_{j.r_j|c}^{I(y_j = r_j)} \quad (5)$$

The indicator function I ($y_j=r_j$) is equal to one whenever $j=r_j$ (that is, for response patterns different from the one being analyzed, the base is raised to an exponent equal to zero).

Parameter estimation

The relationship between the observed variables and the latent variables is measured by the criteria of homogeneity and class separation. The former refers to the degree of similarity of the response patterns of members within the same class. The closer the value of the probability $\rho_{j,r_j|c}$ is to one, the more homogeneous the class. Separation refers to the degree to which the response patterns of the latent classes differ. Thus, latent classes with high separation are those with observed variables that differ in terms of homogeneity, with each class exhibiting high homogeneity ($\rho_{j,r_j|c} >> 0$) for a different observed variable.

Collins and Lanza (2010) note that the perfect separation of classes is represented by the following expressions:

$$P(Y=y' \mid L=c')=1 \text{ and } P(Y=y' \mid L=c)=0 \qquad c' \neq c \tag{6}$$

where $P(Y=y' \mid L=c')$ is the probability associated with the response pattern vector y' conditional on membership in class c'.

One might also be interested in determining which latent class (c) an individual belongs to based on his/her response pattern y. This probability $P(L = c|Y = y)$, which is termed the posterior or classification probability, is directly related to the concepts of homogeneity and separation mentioned above and can be calculated using Bayes' theorem:

$$P(L = c|Y = y) = \frac{P(Y = y \mid L = c) \,.\, P(L = c)}{P(Y = y)} \tag{7}$$

Replacing the terms on the right side of the equation above with the expressions previously used, we obtain the following result:

$$P(L = c|Y = y) = \frac{\prod_{j=1}^{J} \prod_{r_j=1}^{Rj} \rho_{j,r_j|c}^{\,I(y_j=r_j)} \,.\, \gamma_c}{\sum_{c=1}^{C} \gamma_c \prod_{j=1}^{J} \prod_{r_j=1}^{Rj} \rho_{j,r_j|c}^{\,I(y_j=r_j)}} \tag{8}$$

Thus, the model estimates two types of parameters: the probability associated with each latent class (γ_c), also known as prevalence, and the item response probability, $\rho(j,r_j|c)$.

The estimation is usually performed through an iterative procedure that uses the Expectation Maximization (EM) algorithm, which employs successive attempts to estimate the model using maximum likelihood methods. Thus, the parameters estimated by the algorithm represent the values that would be the most likely to generate the sample in question (Sepúlveda, 2003).

The first step of the estimation is to determine the number of latent classes in the model. This step requires the use of criteria such as statistical analysis, parsimony and interpretation that are applied simultaneously.

Choosing the best model using the likelihood-ratio statistic G2

Lower values of G^2 indicate that the parameters fit the sample. The observed frequencies for each response pattern are compared to their expected frequencies, which generates an indicator that measures the extent to which the model fits the sample

$$G^2 = 2 \sum_{w=1}^{W} O_w \, Ln\left(\frac{O_w}{E_w}\right) \tag{9}$$

where

. Ow is the observed frequency of response pattern w, and

. Ew is the expected frequency for that response pattern.

The G^2 test statistic can be compared to a chi-square distribution in which calculating the right tail probability requires calculating the degrees of freedom. Collins and Lanza (2010) state that the degrees of freedom in a latent class model are calculated as follows:

$$D_f = (w - P - 1) \tag{10}$$

where

. W is the number of response patterns (that is, the number of cells in the contingency table), and

. P is the number of estimated parameters.

The expression that defines W is displayed in equation (1). The number of parameters is calculated as follows:

$$P = C\,\Sigma_{j=1}^{J}(R_J - 1) + (C - 1) \quad (11)$$

where

. C is the number of estimated latent classes,

. Rj is the number of values that the observed variable j can assume, and

. P is the number of estimated parameters.

Choice criteria: the AIC and BIC tests

Both the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) tests are information criteria in which lower values indicate a better model fit to the data:

$$AIC = G^2 + 2P \quad (12)$$

$$BIC = G^2 + \ln(n) * P \quad (13)$$

where

. P = the size of the sample, and

. n = the number of estimated parameters.

Because G^2, AIC and BIC test results do not produce a clear, straightforward choice in all cases, additional criteria must be used. In addition to parsimony, the estimate of the number of latent classes should also consider input from subject-matter experts and researcher experience to avoid a choice based solely on mathematical and statistical features that might affect the interpretation of the model.

Alternatively, calculation of the AIC and BIC can be based on the degrees of freedom, which also provide information on the number of parameters (Biemer, 2011):

$$AIC(G^2) = G^2 - 2 * D_f \quad (14)$$

$$BIC(G^2) = G^2 + \ln(n) * D_f \quad (15)$$

where D_f = degrees of freedom (equation 10).

Additionally, Sample-Size Adjusted Bayesian Information (SABIC) is also considered a common information-theoretic criterion index (Beaujean, 2014) and tends to avoid overestimation of the number of extracted classes. This information criterion derived from BIC adjusting the penalty term (Tein, Coxe, & Cham, 2013) as per below:

$$SABIC(G^2) = G^2 - \ln((n + 2) / 24) * D_f \quad (15a)$$

Data and Variables

Overview

Global distribution systems provide booking-related information through the data source referred to as the Marketing Information Data Tape (MIDT). Different service providers in the tourism industry use these data for purposes such as resource planning, market share monitoring and decision making. Providers include airlines, travel agencies and global distribution systems.

Study data

The study analyzed MIDT data extracted from January 2011 to December 2012, stratified by month, with respect to 4,288 points of sale (POS) for 2,342 different travel agencies operating in Brazil. The bookings corresponded to reservations made for 546 Brazilian domestic and international airlines. The sample was also stratified by year to determine the extent to which group behavior changed during the course of the surveyed years.

The terms **booking** or **reservation** in the context of this study do not necessarily indicate that the sales were effective or that an airline ticket was issued. Thus, there might not be any revenue associated with the booking process. Similarly, the term **cancellation** does not necessarily indicate any total or partial refund because there might not be a ticket issued and/or payment made at the time of the reservation. Both airlines and travel agencies have automatic or manual mechanisms to maximize their revenues. Some mechanisms monitor bookings that have not been converted into actual sales, canceling them based on a set of criteria (for example, departure flight date). The data used in this study do not include information on the criteria for canceling the booking, who originated the cancellation process or if the cancellation was automated or manual. Similarly, the data include no indicators to flag attempts to defraud reservation systems (for example, the deliberate creation of false bookings on a particular flight that would be canceled later to save certain seats for potential passengers). Therefore, the current study assumed that the observed frequency of bookings and cancellations was based on the regular business processes of the travel agencies in the sample.

Because airline reservation cancellations could occur in a month other than the month in which the booking occurred, negative net bookings were observed for some travel agencies in certain months.

The sample data included monthly data on the number of bookings created and canceled at each point of sale (POS). Data were stratified by airline and the city in which the booking or cancellation occurred. The data also included information regarding the GDS used in generating the booking or cancellation. Table 1 describes the types of sample data used in this study.

Table 1

MIDT Sample Data

Year	The year in which the booking was created or canceled (2011 or 2012)
Month	The month in which the booking was created or canceled
GDS	The GDS used in generating the booking or cancellation
Travel Agency Name	The travel agency responsible for the POS that generated the booking and/or cancellation
Market Name	A reference classifying points of sale (POS) that belonged to the same chain
City Code	The IATA City Code of the point of sale (POS)

Continues

Table 1 (continued)

Airline Code	The IATA airline code associated with the booking or cancellation
Airline	The airline name
Bookings (A)	The total number of reservations made during a particular month
Canceled Bookings (B)	The total number of reservations canceled during a particular month
Net Bookings	The total bookings minus canceled bookings for a particular month, which is equal to (A) – (B)

Note. Source: elaborated by the authors.
For more information on the data used, please contact the authors.

Only points of sale (POS) that reported data for all observed periods were included in the survey. A travel agent might be associated with one or more POS. Because of the disintermediation process, approximately 37% of airline bookings in Brazil are not made through a GDS (Juman, 2011). This detail might bias the classification, particularly in regard to the number of net bookings and cancellations. The collected data were consolidated as displayed in Table 2.

Table 2

Description of the Study Variables

Variable	Type	Description
Agency	Text	Travel agency chain identifier
GDS Quantity	Integer	The number of GDSs used in a given year
Domestic Airlines	Integer	The number of Brazilian Airlines seats booked by the travel agency through a GDS
International Airlines	Integer	The number of international airlines booked by the Travel Agency through a GDS
City Quantity	Integer	The number of Brazilian cities in which a particular travel agency is located.
Net Bookings	Integer	The total bookings minus canceled bookings in a particular month.
Canceled Bookings	Percentage	The cancellation per booking ratio

Note. Source: elaborated by the authors.
For more information on the data used, please contact the authors.

The groups labeled **Agency** in Table 2 were obtained by combining the data contained within the fields **Travel agency name** and **Marketing name** identified in Table 1. Because latent class analysis uses categorical data and some source data were continuous data, the data were categorized so that the analysis could be performed using the latent class method. The criteria employed and the initial results are presented in Table 3.

Table 3

Data Categorization

Category	1	2	3	4	5
GDS Quantity	1	2	>2		
% POS:	85.91%	11.64%	2.46%		
Domestic Airlines	0	1	2	>2	
% POS	1.02%	10.01%	61.32%	27.65%	
International Airlines	0 to 10	11 to 70	>70		
% POS	4.50%	86.76%	8.73%		
City Quantity	1	2 to 5	6 to 60		
% POS	84.69%	14.11%	1.2%		
Net_Bookings	0 to 6,000	6,001 to 20,000	20,001 to 100,000	100,001 to 500,000	>500,000
% POS	90.33%	5.94%	2.78%	0.75%	0.21%
Cancel_Booking	0% to 60%	>60% to 80%	>80% to 100%	> 100%	
% POS	6.34%	42.85%	50.49%	0.32%	

Note. Source: elaborated by the authors.
For more information on the data used, please contact the authors.

Table 3 indicates that 85.91% of the POS used only 1 GDS and reveals that 84.69% of the travel agencies were located in a single city. The number of canceled bookings is also noteworthy: the table indicates that 93.66% of agencies canceled more than 60% of the bookings they generated. However, 86.76% of the points of sale (POS) generated reservations with as many as 70 international airlines per year, indicating that they sold international trips to several different countries. The table also reveals that only 1.02% of the POS did not book Brazilian Airlines through a GDS, indicating that they use global distribution systems only for international flight reservations and not for domestic flights.

Due to the complexity of the above data, it is not possible to directly identify strategic groups by merely observing cross indicators from each category. The latent class analysis used to identify strategic groups is described in the next section.

Empirical Analysis of the Data

The 2011 and 2012 cross-sectional data were submitted to estimation tests using LatentGOLD®. The G^2, AIC, BIC and SABIC test values are presented in Tables 4 and 5. The BIC and SABIC test penalizes both the number of parameters and sample size. The results obtained for the 2011 data are consistent with those found for the corresponding periods in 2012.

Table 4

G2, BIC, SABIC and AIC Tests for 2011

Number of Latent Classes	Sample size	Number of parameters	Degrees of Freedom	G^2	BIC	SABIC	AIC
3 Classes	2342	30	2129	910.1011	-15608.3001	-8844,0409	-3347.8989
4 Classes	2342	37	2122	736.2601	-15727.8298	-8985,8109	-3507.7399
5 Classes	2342	44	2115	593.9077	-15815.8709	-9096,0924	-3636.0923
6 Classes	2342	51	2108	552.6163	-15802.8509	-9105,3129	-3663.3837
7 Classes	2342	58	2101	522.5843	-15778.5716	-9103,274	-3679.4157
8 Classes	2342	65	2094	447.2768	-15799.5678	-9146,5105	-3740.7232

Note. Source: elaborated by the authors.
For more information on the data used, please contact the authors.

Table 5

G2, BIC, SABIC and AIC Tests for 2012

Number of Latent Classes	Sample size	Number of parameters	Degrees of Freedom	G^2	BIC	SABIC	AIC
3 Classes	2342	30	2129	863.3768	-15655.0244	-8890,7651	-3394.6232
4 Classes	2342	37	2122	697.6742	-15766.4157	-9024,3968	-3546.3258
5 Classes	2342	44	2115	549.0273	-15860.7512	-9140,9728	-3680.9727
6 Classes	2342	51	2108	512.8864	-15842.5808	-9145,0428	-3703.1136
7 Classes	2342	58	2101	463.2436	-15837.9123	-9162,8147	-3738.7564
8 Classes	2342	65	2094	417.6443	-15829.2003	-9176,143	-3770.3557

Note. Source: elaborated by the authors.
For more information on the data used, please contact the authors.

Lower values for the above tests indicate a better model fit to the sample data. Moreover, the choice of the number of classes must balance the statistical results with two other criteria: parsimony regarding the number of parameters and the economic interpretation of the model.

Although all the models fit the data reasonably well, the 5-class model was chosen based on the slowly decreasing G^2 and AIC values found in models with more than 5 classes. Moreover, the downward trend of the BIC values was reversed once the model included more than 5 classes. Slowly decreasing, SABIC values were also observed for models with more than 5 classes.

Furthermore, evaluation of the models that include 6, 7 or 8 classes revealed poor separation and homogeneity. Because the number of estimated parameters also increased considerably, these models were not considered to be parsimonious.

Figure 3 presents the distribution of POS per group for the 5-class model. Groups were named after the quantity of POS each group presented. Group 1 has the majority of POS (almost 70% of the sample's POS) and Group 5 has the fewest POS in the sample (approximately 3%).

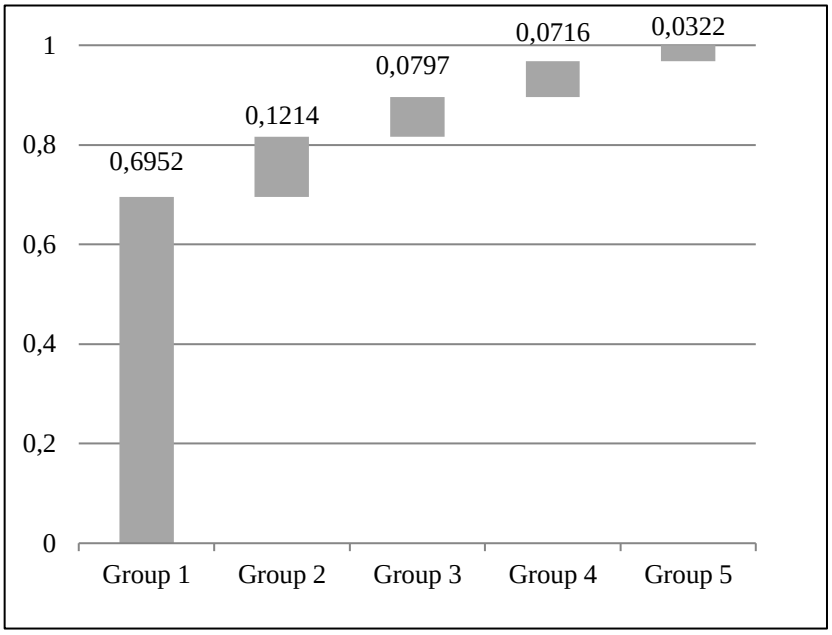

Figure 3. 5-Class Model: Point-of-Sale (POS) Distribution
Source: elaborated by the authors.
For more information on the data used, please contact the authors.

Figure 4 presents the normalized (0-1) mean for each group to facilitate the identification of each group's characteristics and reveal the clear separation for certain features. For instance, Group 5 represents slightly more than 3% of the total number of points of sale, but was responsible for most net bookings and maintained a presence in many cities. In contrast, Group 1 produced very few bookings but represents approximately 70% of the POS.

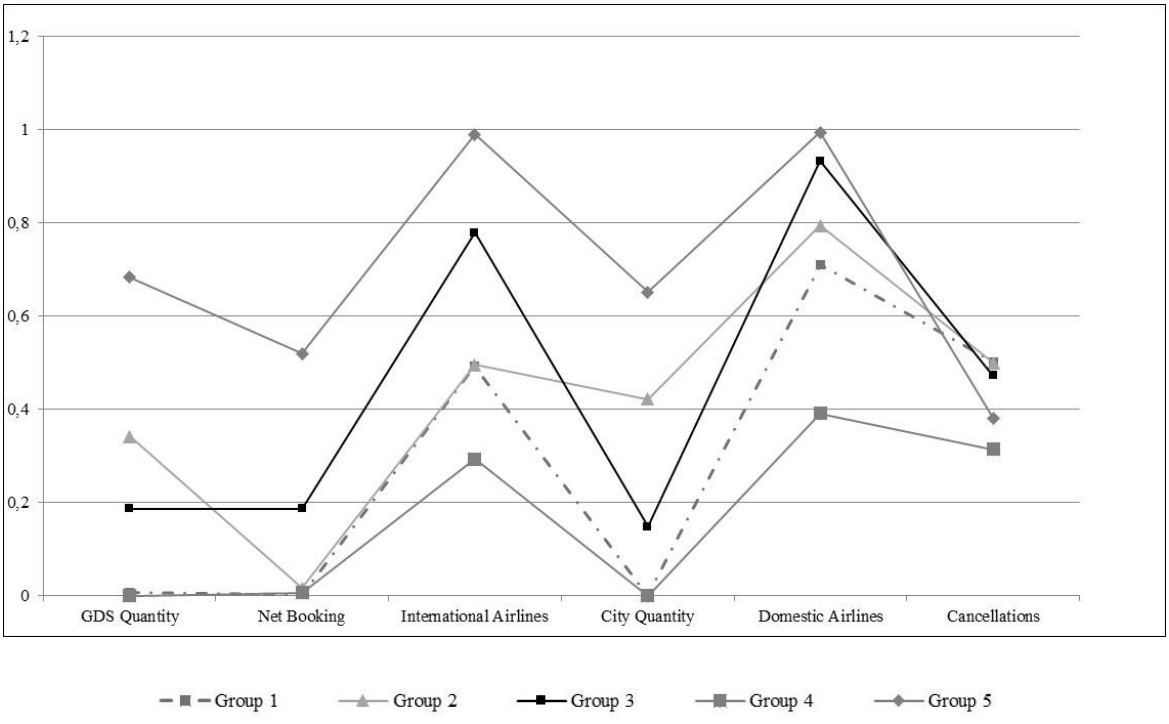

Figure 4. 5-Class Model with a "0-1" Normalized Mean
Source: elaborated by the authors.
For more information on the data used, please contact the authors.

The number of GDSs used by travel agencies also reveals a clear separation between the groups. Because the airline content is virtually identical for different GDSs, the finding that some travel agencies are associated with more than one global distribution system is surprising. This finding is discussed in greater detail below.

Table 6 presents the item response probability for each group. The highest values are presented in boldface to highlight the extent to which homogeneity was high or low. Low homogeneity would be represented when each category within the same class has a similar response probability; high homogeneity would be represented by the opposite.

Table 6

The 5-Class Model

		Group 1	Group 2	Group 3	Group 4	Group 5
Response Item	Category	69.52%	12.14%	7.97%	7.16%	3.22%
GDS Quantity						
1	1	**98.55%**	**40.30%**	**64.80%**	**99.97%**	7.22%
2	2	1.44%	**51.06%**	**32.96%**	0.03%	**48.77%**
3 or more	3	0.00%	8.65%	2.24%	0.00%	**44.00%**
	Average	1.0145	1.6835	1.3744	1.0003	2.3678
Domestic Airlines						
0	1	0.15%	0.02%	0.00%	13.99%	0.00%
1	2	8.74%	3.05%	0.19%	**55.27%**	0.00%
2	3	**68.86%**	**55.49%**	19.54%	**30.07%**	1.65%
3 or more	4	**22.24%**	**41.44%**	**80.27%**	0.67%	**98.34%**
	Average	3.1319	3.3835	3.8007	2.1742	3.9834
International Airlines						
00 • 10	1	2.37%	2.13%	0.01%	**41.34%**	0.00%
11 • 70	2	**96.52%**	**96.63%**	**44.06%**	**58.63%**	1.85%
71 • 150	3	1.11%	1.24%	**55.93%**	0.02%	**98.15%**
	Average	1.9873	1.9911	2.5592	1.5868	2.9815
City Quantity						
01	1	**99.98%**	17.22%	**70.33%**	**99.97%**	0.63%
02 • 05	2	0.02%	**81.18%**	**29.62%**	0.03%	**68.43%**
06 • 60	3	0.00%	1.60%	0.05%	0.00%	**30.94%**
	Average	1.0002	1.8439	1.2972	1.0003	2.303

Continues

Table 6 (continued)

Response Item	Category	Group 1	Group 2	Group 3	Group 4	Group 5
		69.52%	12.14%	7.97%	7.16%	3.22%
Net Bookings						
➔ 6,000	1	**98.93%**	**93.55%**	**41.63%**	**97.42%**	3.14%
6,001 • 20,000	2	1.06%	6.31%	**43.06%**	2.56%	21.37%
20,001 • 100,000	3	0.00%	0.14%	14.21%	0.02%	**46.40%**
100,001 • 500,000	4	0.00%	0.00%	1.05%	0.00%	**22.58%**
More than 500,000	5	0.00%	0.00%	0.05%	0.00%	6.51%
	Average	1.0107	1.0659	1.7481	1.026	3.0796
Canceled Bookings						
➔ 60%	1	4.64%	4.75%	6.60%	25.03%	15.51%
+60% • 80%	2	40.34%	40.68%	45.12%	**55.65%**	**54.53%**
+80% • 100%	3	**54.73%**	**54.29%**	**48.08%**	19.29%	29.89%
> 100%	4	0.29%	0.28%	0.20%	0.03%	0.06%
	Average	2.5067	2.501	2.4187	1.9431	2.1451

Note. Source: elaborated by the authors.
For more information on the data used, please contact the authors.

For instance, both separation and homogeneity appear to be poor for booking cancelations. However, the agencies in Groups 4 and 5 exhibited similar behaviors although they produced completely different net bookings. This result is directed related to our first hypothesis:

> **H1:** There are similarities that ensure strategic group formation and dissimilarities that justify distinctions among them.

The supporting evidence is Group 5 agencies producing most major airline bookings, whereas Group 4 agencies produce the fewest bookings.

It is also noteworthy that Groups 3 and 5 frequently used GDSs to make reservations on Brazilian airlines that stimulate the bypass of GDSs. These data are primarily relevant for estimates of airline ticket sales in Brazil, which indicate that approximately 37% of domestic flight tickets are sold through airline direct sales channels rather than through a GDS (Juman, 2011).

Characteristics of individual groups

The latent class model identified the following groups, whose specific characteristics are described below:

. Group 1: Micro and Small Agencies

. Group 2: GDS Migration Agencies

. Group 3: Medium-Sized Agencies

. Group 4: Micro and Small Agencies – Leisure Tour Packages

. Group 5: Mega-Travel Agencies

Group 1 was named Micro and Small Agencies mainly because of the quantity of GDS (98.55% had only 1 GDS), their net bookings rates (98.93% had fewer than 6,000 bookings per year) and their presence in only one city (99.98% of them). In terms of representation, 68.52% of the surveyed agencies were members of Group 1. Companies belonging to this group exhibited high rates of booking cancellations. These agencies made reservations with domestic and international airlines; there was a 96.52% probability that an agency in this group generated reservations on as many as 70 different international airlines per year. Due to the difficulty in obtaining credit for ticket issuance, it seems that members of this group developed partnerships with larger travel agencies (consolidators), which grant market power to the big travel agencies and sales commissions and other rewards to the smaller agencies.

In direct opposition to Group 1's characteristics, Group 5 was labeled Mega-Travel Agencies because companies in this group produced high numbers of bookings for both domestic and international airlines, had points of sale in most Brazilian cities and exhibited slightly fewer booking cancellations compared to the other groups. The last feature seemed to be due to the higher number of net bookings and to a revenue management monitoring process that converted bookings into actual sales and avoided booking cancellations.

With respect to the use of multiple global distribution systems, the data indicated a 92.77% likelihood that a member of this group was associated with more than one GDS and a 44% probability of association with 3 GDSs. This finding might be related to the strategy of bargaining with GDSs, which reward agencies that produce high numbers of bookings. This finding might also be related to the presence of large consolidators in this group. Consolidators might associate with multiple GDSs to increase the opportunities to affiliate with small agencies that book flights and then transfer the reservation to the consolidator who issues the airline ticket. This practice occurs because many small agencies lack sufficient credit with the airline and depend on larger travel agencies, which assume the credit risk and have the power to negotiate prices/tariffs with the airlines.

The Mega-Travel Agencies participated in different segments: as tour operators that sell travel packages, as consolidators that intermediate between small agencies and airlines or as large travel management companies (TMCs). These agencies could also participate in more than one segment. Although it was responsible for most reservations created by the GDSs, this group represented approximately 3% of the points of sale in the sample.

Group 3 was labeled Medium Sized Agencies. Although 64.8% of the agencies in this group were associated with a single GDS, a significant percentage (32.96%) used two global distribution systems. These agencies used GDS to make reservations for most domestic airlines and also booked seats in over 150 international airlines throughout the year (55.93%). Their levels of booking production were between Groups 1 and 5.

Identifying common characteristics in members of this group was challenging because 41.63% of the points of sale produced a low volume of airline reservations, whereas 57.27 % produced a high or exceptionally high volume of airline bookings. The combination of using more than one GDS and low booking production might be explained by the presence of consolidators in this group because consolidators typically do not create many bookings but primarily focus on issuing tickets for the reservations transferred to them by smaller travel agencies. The booking cancellation rate in this group appeared to be similar to most other groups. With respect to geographic distribution, the members of this group were located in as many as 5 cities, indicating that their operation was either local or regional.

Group 2 identified by the model represents travel agencies with very low booking production that used 2 GDSs in the same year. Members of this group were most likely associated with 2 GDSs because they migrated from one global distribution system to another during the course of the year. Although this event might also be true of Group 3 members, migration effects were less evident in that group. For some small travel agencies, the incentives and support provided by consolidators could reduce or eliminate the cost of migrating from one GDS to another, facilitating the migration of those agencies.

Finally, Group 4 members differed from Group 1 members primarily with respect to the lower percentage of booking cancellations and the high concentration of booking productions in a few domestic and international airlines.

In-depth examination of this group revealed that most travel agencies in this group focused on sales of travel packages offered by large tour operators. These travel packages typically included airline tickets, indicating that the related bookings were made directly by the tour operators. Thus, it seems that Group 4 members seldom booked flights that were not part of tour packages. This group was identified as Micro and Small Agencies - Leisure Tour Packages to distinguish them from the Group 1 travel agencies that exhibited a more straightforward association with the major consolidators.

These conclusions lead us to the analysis of our second hypothesis:

H2: These groups have some common factor within each group and identifying this factor would lead to better understanding of their behavior.

Table 6 reveals a combination of factors that identify a group distinctiveness. For Group 1, the Micro and Small Agencies, its definition comes from the interaction of a unique GDS used when present in only one city. Group 2, the GDS Migration Agencies, are characterized by having between 1 and 2 GDS systems, presence in few cities (but more than one unique city) and a low number of net bookings.

The Medium Sized Agencies, Group 3, is characterized by a low number of GDS use but more international airline reservations and a higher number of net reservations than Group 2. The fourth group, Leisure Tour Packages, has a low number of GDS (99.97% use only one GDS for its reservations), but it covers a considerable number of national and international airlines with a lower percentage of cancellations than Groups 1, 2 and 3 (between 60 and 80%). Finally, the last group, the Mega-Travel Agencies can be characterized by the use of numerous GDS, access to many national and international airlines, a very high number of net bookings with the same cancellation percentage as Group 4. Figure 5 summarizes the strongest relationships among the travel agency strategic groups and other market participants identified in this study.

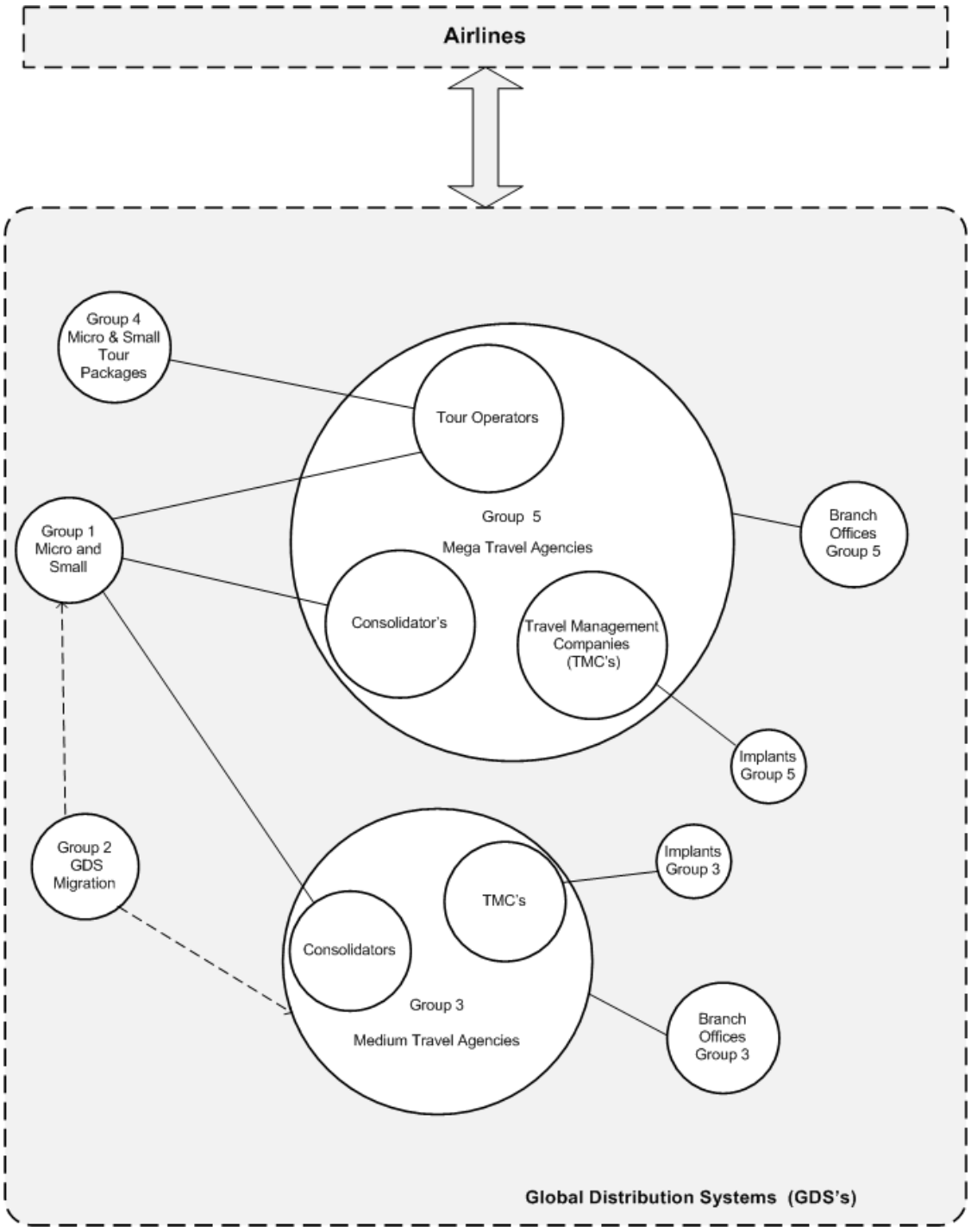

Figure 5. Travel Agency Strategic Group Partnerships
Source: Authors' qualitative analysis of results of the latent class analysis.

Finally, these conclusions lead us back to our initial question: is the disintermediation process promoted by the airline industry reducing the competitiveness of travel agencies or even reducing their market? The answer is our third hypothesis:

> **H3:** If this strategic behavior is identified, we can conclude that this market may be struggling to survive on a different economic environment, but it indicates strength not detected before.

Observing our results, it is noticeable that this market is experiencing change – especially considering the context of airline industry during the second decade of the 2000s (ABEAR, n.d.;

retrieved March 2014 from http://www.abear.com.br/dados-e-fatos/page), but the type of change can be defined by forming different types of market cells that can be grouped as strategic players. It does not resemble a stagnated or inactive market by any means. The movement of bookings and use of different types of GDS indicate strategic movements to deal with this new economic environment, and reactions to this disintermediation are still on course. Small and medium-sized agencies would have vanished by now if they did not offer a service or an advantage to retain loyalty from consumers. Unifying with similar businesses in distinctive groups similar appears to be their competitive advantage and strategic plan for survival.

Conclusions

To our knowledge, this study is the first to use an empirical approach to identify strategic groups of firms in the travel agency market in Brazil. The latent class model was used to identify and analyze the different strategies adopted by travel agencies in the Brazilian market in regard to the geographic capillarity of their points of sale, the number of airline bookings they generated and their association with global distribution systems (GDSs) as well as examine the complex relationships of collaboration and competition among participants in this chain.

The market for Brazilian travel agencies primarily consists of micro and small businesses that are associated with larger agencies that have bargaining power with both the GDSs and the airlines. This connection occurs through the airline tickets embedded within tour packages and also through stand-alone bookings that are transferred electronically to larger agencies for ticket issuance. Thus, interdependency is created in which a group of smaller companies increases the business power of another group of consolidators and/or tour operators in exchange for incentives and commissions.

The Mega-Travel Agency group consisted of a very small number of firms that were associated with at least two GDSs. Because the airline content of different GDSs is virtually identical (McDonald, 2007), this finding suggests that these Mega-Travel Agencies negotiate incentives based on their ability to shift booking production from one global distribution system to another, which increases competition among the GDSs. This group includes tour operators, travel management companies and consolidators, whose association with more than one GDS facilitates their collaboration with a greater number of micro and small agencies.

An intermediate group, the Medium-sized Agencies, created a significant number of bookings in several different airlines through one or more GDSs. The geographic capillarity of their point of sales was limited to fewer cities than found in the previous group. This group also included agencies, such as consolidators, that focused on issuing airline tickets.

The model also captured the migration of travel agencies from one GDS to another, which suggests that although the market has only a few GDSs, they are highly competitive.

Thus, the different groups identified by the latent class model support the claim that travel agencies form strategic groups that operate in a highly complex environment in which the parties alternately collaborate and compete with one another (H1). Small agencies collaborate and compete with larger agencies that serve as both the clients and competitors of airlines. Airlines, in turn, compete with both GDSs and travel agencies while simultaneously depending on these competitors to increase the volume of their sales. In this environment, larger travel agencies associate with different GDSs and small agencies to increase the volume of bookings and extend their bargaining power with respect to the airlines, producing a recursive cycle of power and dependency.

In the context of the sophisticated business scenario that travel agencies in the Brazilian market confront, the model used in this study organizes a complex array of information (H2) through an analysis that provides insight into the strategies and relationships exhibited by travel agencies, GDSs and airlines.

The study results do not support claims regarding the demise of micro and small travel agencies or GDSs in the Brazilian market (H3) because the larger travel agencies that serve as tour operators and consolidators extensively use global distribution systems to generate airline reservations (particularly for international carriers, where airline dependence on the GDS is higher) in collaboration with smaller agencies.

However, travel agencies participate in a tourism market that involves multiple factors and relationships. Thus, no single or definitive perspective predominates, and the market must be analyzed from many different perspectives – as customer segmentation, travel agency segmentation within the GDS portfolio, airline distribution strategies in each market and GDS customer retention and market share expansion strategies. This situation presents opportunities for future studies using the latent class method to examine additional variables and identify other relationships and strategies exhibited by travel agencies in the Brazilian market. For instance, using data outsourced by airline companies directly would increase the information about the type of reservation made, destinations of the travelers and other information that could better characterize the travel agencies' business. Similarly, a survey with travel agents and their perception about this market in transition would bring a novel angle to analyzing the strategic position of travel agencies. Finally, the methods used in this study might also be used to identify important characteristics of other markets, such as hospitals and the health care industry, another market with a low level of understanding that is currently becoming a more concentrated business similar to the airline industry.

References

Abou-Shouk, M., Lim, W. M., & Megicks, P. (2016). Using competing models to evaluate the role of environmental pressures in ecommerce adoption by small and medium sized travel agents in a developing country. *Tourism Management*, *52*, 327-399. http://dx.doi.org/10.1016/j.tourman.2015.07.007

Airlines for America. (n.d.). *Monthly oil and jet fuel prices*. Retrieved September 21, 2013, from http://airlines.org/data/average-spot-prices/

Associação Brasileira das Empresas Aéreas. (n.d.). *Outlook 2013*. Retrieved May 21, 2014, from http://abear.com.br/uploads/arquivos/dados_e_fatos_arquivos_eng/Outlook_2013_English_final.pdf

Bassi, F. (2013). Analyzing markets within the latent class approach: an application to the pharm sector. *Applied Stochastic Models in Business and Industry*, *29*(3), 199-207. http://dx.doi.org/10.1002/asmb.1910

Beaujean, A. A. (2014). *Latent variable modeling using R: a step-by-step guide*. New York: Routledge Taylor and Francis Group.

Berne, C., Garcia-Gonzalez, M., & Mugica, J. (2012). How ICT shifts the power balance of tourism distribution channels. *Tourism Management*, *33*(1), 205-214. http://dx.doi.org/10.1016/j.tourman.2011.02.004

Bhatnagar, A., & Ghose, S. (2004). A latent class segmentation analysis of e-shoppers. *Journal of Business Research*, *57*(7), 758-767. http://dx.doi.org/10.1016/S0148-2963(02)00357-0

Biemer, P. P. (2011). *Latent class analysis of survey error*. New Jersey: Willey.

Buhalis, D. (2000). Distribution channels in the changing travel. *International Journal of Tourism Research*, *2*(5), 357-359. http://dx.doi.org/10.1002/1522-1970(200009/10)2:5<357::AID-JTR233>3.0.CO;2-B

Cento, A. (2009). *The airline industry: challenges in the 21st century*. Berlin: Springer-Physica-Verlag HD.

Chao, C., Chen, H., & Yeah, T. (2015). A comprehensive relationship marketing model between airlines and travel agencies: the case of Taiwan. *Journal of Air Transport Management*, *47*, 20-31. http://dx.doi.org/10.1016/j.jairtraman.2015.03.015

Cheung, R., & Lam, P. (2009). How travel agency survive in e-business world?. *Communications of the IBIMA*, *10*, 85-92. Retrieved from http://www.ibimapublishing.com/journals/CIBIMA/volume10/v10n11.pdf

Collins, L. M., & Lanza, S. T. (2010). *Latent class and latent transition analysis*. New Jersey: Willey.

Cullmann, A. (2012). Benchmarking and firm heterogeneity: a latent class analysis for German electricity distribution companies. *Empirical Economics*, *42*(1), 147-169. http://dx.doi.org/10.1007/s00181-010-0413-4

Czepiel, J. A. (1992). *Competitive marketing strategy*. Englewood Cliffs: Prentice Hall.

Díaz, E., & Martín-Consuegra, D. (2016). A latent class segmentation analysis of airlines based on website evaluation. *Journal of Air Transport Management*, *55*, 20-40. http://dx.doi.org/10.1016/j.jairtraman.2016.04.007

Duliba, K., Kauffman, R., & Lucas, H. (2001). Appropriating value from computerized reservation system ownership in the airline industry. *Organization Science*, *12*(6), 702-728. http://dx.doi.org/10.1287/orsc.12.6.702.10087

Figueiredo, P. N., Gomes, S., & Farias, R. (2010). Capacidade tecnológica inovadora em empresas do setor turístico: um estudo dos hotéis na cidade do Rio de Janeiro durante o período 1990-2008. *Revista de Administração Pública*, *44*(5), 1139-1170. http://dx.doi.org/10.1590/S0034-76122010000500007

Granados, N. F., Kauffman, R. J., & King, B. (2008). How has electronic travel distribution been transformed? A test of the theory of newly vulnerable markets. *Journal of Management Information Systems*, *25*(2), 73-96. http://dx.doi.org/10.2753/MIS0742-1222250204

Greene, W. H., & Hensher, D. A. (2013). Revealing additional dimensions of preference heterogeneity in a latent mixed multinomial logit model. *Applied Economics*, *45*(14), 1897-2901. http://dx.doi.org/10.1080/00036846.2011.650325

International Air Transport Association. (n.d.). *Jet fuel price development*. Retrieved September 21, 2013, from http://www.iata.org/publications/economics/fuel-monitor/Pages/price-development.aspx

International Air Transport Association. (2015, December 10). *Economic performance of the airline industry*. Retrieved March 15, 2016, from https://www.iata.org/whatwedo/Documents/economics/IATA-Economic-Performance-of-the-Industry-end-year-2015-report.pdf

Iordache, C., & Voiculet, A. (2010). Prospects of computer – assisted booking and global distribution systems. *Young Economists' Journal/Tinerilor Economisti*, *8*(14), 83-92.

Juman, D. (2011, April). *Latin America: navigating the emerging online travel marketplace - research highlights*. Retrieved from http://www.travelfocus.cl/pdfupload/online_lat_am.pdf

Lago, R., & Cancellier, E. L. P. de L. (2005). Agências de viagem: desafios de um mercado em reestruturação. *Revista Turismo - Visão e Ação*, *7*(3), 495-502. http://dx.doi.org/10.14210/rtva.v7n3.p507-514

Marin, A. (2004). *Tecnologia da informação nas agências de viagem: em busca da produtividade e do valor agregado*. São Paulo. Aleph.

McDonald, M. (2007, April 30). *Airlines differ on fate of CRS Code of Conduct*. ATW Online. Retrieved September 21, 2013, from http://atwonline.com/operations/Airlines-differ-fate-crs-code-conduct

Murthi, B. P. S., Rasheed, A., & Goll, I. (2013). An empirical analysis of strategic groups in the airline industry using latent class regressions. *Managerial and Decision Economics*, *34*(2), 59-73. http://dx.doi.org/10.1002/mde.2574

Pereira, A. (1987). *Breve história da aviação comercial brasileira*. Rio de Janeiro, Brasil: Editora Europa Gráfica.

Raymond, L., & Bergeron, F. (1997). Global distribution systems: a field study of their use and advantages in travel agencies. *Journal of Global Information Management*, *5*(4), 23-32. http://dx.doi.org/10.4018/jgim.1997100103

Sepúlveda, R. A. (2003). *Contribuciones al análisis de clases latentes en presencia de dependencia local* (Tesis doctoral). Departamiento de Estatística, Universidad de Salamanca, Salamanca, España.

Tein, J. Y., Coxe, S., & Cham, H. (2013). Statistical power to detect the correct number of classes in latent profile analysis. *Structural Equation Modeling*, *20*(4), 640-657. http://dx.doi.org./10.1080/10705511.2013.824781

Van Vleck, J. (2013). *Empire of the air: aviation and the American ascendancy*. Cambridge, MA: Harvard University Press.

Authors' Profiles

Regina Madalozzo
Rua Quatá, 300, 04546-042, São Paulo, SP, Brazil. E-mail address: reginam@insper.edu.br

Paulo Cesar Fernandes
Rua Quatá, 300, 04546-042, São Paulo, SP, Brazil. E-mail address: paulocf@yahoo.com